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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* CHARLOTTE JOHANSEN

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Appeal 2009-009201  
Application 09/815,848  
Technology Center 1600

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Decided: September 15, 2009

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Before DEMETRA J. MILLS, LORA M. GREEN, and  
MELANIE L. McCOLLUM, *Administrative Patent Judges*.

GREEN, *Administrative Patent Judge*.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134 from the Examiner's final rejection of claims 31-37, 41, 42, 46, 48, 49, and 51.<sup>1</sup> We have jurisdiction under 35 U.S.C. § 6(b).

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<sup>1</sup> Claims 31-52 are pending, and claims 38-40, 43-45, 47, 50, and 52 stand withdrawn from consideration (Ans. 4, *see also* App. Br. 1).

## STATEMENT OF THE CASE

Claim 31 is representative of the claims on appeal, and reads as follows:

31. A method of killing or inhibiting a microorganism, comprising contacting said microorganism with a composition comprising a peroxidase produced by or derived from *Coprinus* and a hydrogen peroxide or a source of hydrogen peroxide.

The Examiner relies on the following evidence:

Johansen	WO 96/06532	Mar. 7, 1996
Schneider et al.	WO 96/10079	Apr. 4, 1996

We affirm.

## ISSUE

The Examiner concludes that claims 31-37, 41, 42, 46, 48, 49, and 51, all of the claims on appeal, are rendered obvious by the combination of Johansen and Schneider.

Appellant contends that Johansen teaches that a peroxidase system, alone, does not have an inhibitory effect on microorganisms, thus the combination of references as relied upon by the Examiner does not render the claims on appeal obvious. Appellant contends further that unexpected results support a conclusion that the claims are not rendered obvious by the combination of references relied upon by the Examiner.

Thus, the issues on appeal are:

1) Has Appellant demonstrated that Johansen teaches that a peroxidase system, alone, does not have an inhibitory effect on microorganisms, and thus demonstrating that the Examiner erred in

concluding that the references as combined render the claimed invention obvious? and

2) Has Appellant demonstrated unexpected results that support a conclusion that the claims are not rendered obvious by the combination of references relied upon by the Examiner?

### FINDINGS OF FACT

FF1 The Specification teaches that

it has been found that the combined action of a peroxidase enzyme from the fungus *Coprinus* and an enhancing agent acting as electron-donor, when applied to e.g. a hard surface, skin, mucous membranes, oral cavity, hair, or laundry in the presence of hydrogen peroxide, results in a hitherto unknown synergistic antimicrobial effect.

(Spec. 2.)

FF2 The Examiner rejects claims 31-37, 41, 42, 46, 48, 49, and 51, all of the claims on appeal, under 35 U.S.C. § 103(a) as being obvious over the combination of Johansen and Schneider (Ans. 5). As Appellant does not argue the claims separately, we focus our analysis on claim 31, and claims 32-37, 41, 42, 46, 48, 49, and 51 stand or fall with that claim. C.F.R. § 41.37(c)(1)(vii).

FF3 The Examiner finds that Johansen teaches

methods of killing or inhibiting microorganisms present in laundry by using a detergent composition comprising a antimicrobial peptide in combination with an oxidoreductase (page 3), which is preferably a peroxidase enzyme system (Example 4 and claims 9, 10, 15-21), where a peroxidase enzyme system is a peroxidase in combination with hydrogen peroxide or a hydrogen peroxide generating system (page 7).

(*Id.*)

FF4 The Examiner finds further that “Johansen clearly suggest[s] that the combination of protamine and a peroxidase system is synergistically effective in killing or inhibiting microorganisms (see Example 4) and explicitly recite[s] detergent compositions comprising both protamine and a peroxidase system (see claims 9, 10, 15-21 of Johansen).” (*Id.* at 8.)

FF5 The Examiner notes that the claims do not exclude the inclusion of protamine (*id.* at 8-9).

FF6 Johansen teaches detergent compositions comprising a basic protein, such as protamine, and a cell wall degrading enzyme, such as peroxidase (*see, e.g.,* Johansen, p. 3).

FF7 Example 2 of Johansen compares the minimum inhibition concentration (MIC) for basic proteins and enzymes (*id.* at 21).

FF8 Johansen tested protamine (A), protamine sulphate (B), a peroxidase enzyme system (lactoperoxidase/glucoseoxidase) (C), as well as other proteins and enzymes (D-F) (*id.*).

FF9 The results are presented in Table 4, reproduced below.

Substance Strain	Minimum Inhibitory Concentration ( $\mu\text{g/ml}$ )					
	A	B	C	D	E	F
<i>Listeria monocytogenes</i>	1000	1000	n.e.	n.e.	2000	2000
<i>Staphylococcus aureus</i>	1000	2000	n.e.	n.e.	1500	n.e.
<i>Escherichia coli</i>	1000	n.d.	n.e.	n.e.	1500	n.e.
<i>Pseudomonas aeruginosa</i>	4000	n.d.	n.e.	n.e.	n.e.	n.e.
<i>Pseudomonas fluorescens</i>	3000	4000	n.e.	n.e.	n.e.	n.e.
<i>Shewanella putrefaciens</i>	1000	500	n.e.	n.e.	1500	n.e.
<i>Vibrio parahaemolyticus</i>	1000	500	n.e.	n.e.	2000	n.e.

(Id. at 22.)

FF10 While Johansen defines “n.e.” as “not effective,” Johansen states that “[t]he lactoperoxidase system was effective for maximum 70 hours. The definition of MIC requires an inhibition of at least 100 hours.” (Id.)

FF11 Johansen notes that “[a]part from the effect of lysozyme on *Listeria monocytogenes*, none of the tested enzyme[s] showed any effect.” (Id. at 21.)

FF12 As to Table 4 of Johansen, the Examiner finds that the “definition of MIC require[s] an inhibition of at least 100 hours,” thus the results reported by Johansen appear to be an artifact, and that the “footnote clearly shows that at shorter time periods the peroxidase did appear to inhibit the microorganisms.” (Ans. 7.)

FF13 Johansen teaches further that “[i]mpedimetric measurements carried out as described in example 1 have shown an synergistic effect between

basic peptides as protamine, polyarginine or polylysine and . . . the lactoperoxidase enzyme system.” (Johansen, p. 24.)

FF14 Johansen teaches that protamine or polysine, in combination with lactoperoxidase and glucose oxidase “had a 100% lethal effect on *Pseudomonas fluorescens*, whereas the same strain was not inhibited when treated with any of these three compounds alone.” (*Id.*)

FF15 The Examiner notes that “Johansen does not specifically teach the use of a *Coprinus* . . . as the peroxidase.” (Ans. 5.)

FF16 The Examiner cites Schneider for teaching detergent compositions that comprise a peroxidase, preferably a *Coprinus* peroxidase (*id.* at 6).

FF17 The Examiner concludes that it would have been obvious to the ordinary artisan to use a *Coprinus* peroxidase as taught by Schneider in the composition of Johansen as the detergent compositions taught by Schneider and Johansen are substantially identical, and Johansen teaches that any peroxidase would be useful (*id.*).

## PRINCIPLES OF LAW

The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) the level of ordinary skill in the art; (3) the differences between the claimed invention and the prior art; and (4) secondary considerations of nonobviousness, if any. *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966).

“The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 416 (2007).

If a person of ordinary skill can implement a predictable variation, § 103 likely bars its patentability. For the same reason, if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill.

*Id.* at 417. It is proper to “take account of the inferences and creative steps that a person of ordinary skill in the art would employ.” *Id.* at 418. *See also id.* at 421 (“A person of ordinary skill is also a person of ordinary creativity, not an automaton.”).

The burden of demonstrating unexpected results rests on the party asserting them. *In re Klosak*, 455 F.2d 1077, 1080 (CCPA 1972). “It is well settled that results must be established by factual evidence. Mere argument or conclusory statements in the specification does not suffice.” *In re De Blauwe*, 736 F.2d 699, 705 (Fed. Cir. 1984).

## ANALYSIS

Appellant argues that while Schneider teaches “peroxidase systems comprising an enhancer,” Schneider does not teach or suggest “the use of peroxidases to kill or inhibit microorganisms.” (App. Br. 4.) Appellant argues further that while “Johansen discloses compositions capable of killing microbial cells or inhibiting microorganisms,” the component of the composition that kills or inhibits the microorganism is protamine (*id.*).

According to Appellant, Johansen compares the effect of protamine to various enzymes, including a peroxidase enzyme system, and found that the tested enzyme systems did not have an effect on the microorganisms tested



(*id.* (citing Johansen, Example 2, p. 21)). Appellant notes that while the footnote to Table 4 of Johansen, which presents the above results, “states that ‘The lactoperoxidase system was effective for maximum 70 hours. The definition of MIC requires[s] an inhibition of at least 100 hours.’” (App. Br. 4 (alteration in original).) Appellant asserts that this note should be interpreted as that the lactoperoxidase system was active for 70 hours, not “that the peroxidase system was effective for killing or inhibiting microorganism,” in view of Johansen’s statement that “‘none of the tested enzyme showed any effect.’” (*Id.*)

Appellant argues further that while the Examiner found that Johansen suggests that the “‘combination of protamine and a peroxidase system is synergistically effective (see Example 4) in killing or inhibiting microorganisms,’” and also found that the claims do not exclude the use of protamine in the composition, that Johansen provides “no data demonstrating that there is synergism between the peroxidase system and protamine.” (App. Br. 5.) Moreover, even if there is synergism, Appellant asserts that does not render the use of a *Coprinus* peroxidase obvious, as “Johansen states that the peroxidase system alone has no effect.” (*Id.*)

Appellant’s arguments have been considered, but are not deemed to be convincing. We agree with the Examiner that the footnote to Table 4 refers to the ability of lactoperoxidase to inhibit the growth of the microorganisms tested, and not merely that the lactoperoxidase system was active for 70 hours. As noted by the Examiner (Ans. 8), all of Example 4 refers to the effectiveness of the compounds to inhibit microorganisms, and the footnote itself states that the lactoperoxidase system was effective for a

maximum of 70 hours. Thus, Johansen's statement that "none of the tested enzyme[s] showed any effect" refers to how the data was presented in the Table, which in turn was reported based on the definition of MIC, which required inhibition of at least 100 hours. Thus, we find that Johansen teaches that the lactoperoxidase system has inhibitory activity towards microorganisms.

Moreover, as also noted by the Examiner (Ans. 8-9), Johansen also specifically teaches that the combination of a basic peptide, such as protamine, with an enzyme system, such as the lactoperoxidase system, showed a synergistic effect, and that protamine or polysine, in combination with lactoperoxidase and glucose oxidase, had a 100% lethal effect on *pseudomonas fluorescens*, whereas the same strain was not inhibited when treated with any of these three compounds alone. Thus, while Appellant's argue that Johansen presented no data, Johansen teaches that the measurements were carried out as described in Example 1, and also reports the results. See *Amgen Inc. v. Hoechst Marion Roussel, Inc.*, 314 F.3d 1313, 1355 n. 22 (Fed. Cir. 2003) (noting that a prior art reference is presumed to be enabling in the absence of evidence to the contrary).

Appellant argues further, citing page 46 of the Specification, that "the instant [S]pecification shows that *Coprinus* peroxidases have a significant effect in killing or inhibiting microorganisms." (App. Br. 4.) Thus, Appellant asserts, "[t]here is no suggestion in the cited references that *Coprinus* peroxidases are superior antimicrobial agents," and "[t]hus, these results are surprising and unexpected." (*Id.*)

We conclude that Appellant has not met the burden of establishing unexpected results. Page 46 of the Specification is merely a listing of ingredients in detergent compositions, and presents no data as the unexpected superiority of a *Coprinus* peroxidase over other peroxidases.

### CONCLUSIONS OF LAW

We conclude:

1) Appellant has not demonstrated that Johansen teaches that a peroxidase system, alone, does not have an inhibitory effect on microorganisms, and thus Appellant has not demonstrated that the Examiner erred in concluding that the references as combined render the claimed invention obvious. We conclude further that:

2) Appellant has not demonstrated unexpected results that support a conclusion that the claims are not rendered obvious by the combination of references relied upon by the Examiner.

We thus affirm the rejection of claim 31 under 35 U.S.C. § 103(a) as being obvious over the combination of Johansen and Schneider. As claims 32-37, 41, 42, 46, 48, 49, and 51, stand or fall with claim 31, we affirm the rejection as to those claims as well.

### TIME PERIOD FOR RESPONSE

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136 (a).

Appeal 2009-009201  
Application 09/815,848

AFFIRMED

cdc

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